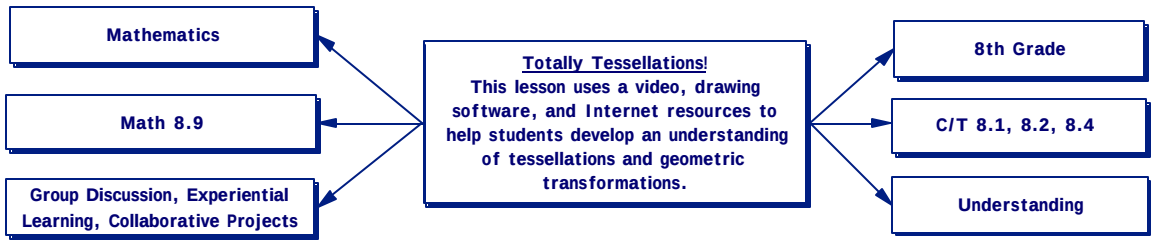

Totally Tessellations!

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Curriculum Area	Mathematics
Subject Area	Geometry
Grade Level	8th grade
Learning Objectives	• The student will develop an understanding of tessellations and geometric transformations. • The student will create tessellating patterns using various forms of transformations. • The student will write a description of their pattern for others to interpret. • The student will use the computer to create an Escher-style tessellation.
Correlation to the SOL	Math 8.9 C/T 8.1, 8.2, 8.4
Video/Technology Hardware/Software Needed	**For class:** Computer with Internet Connection Computer Projection System Drawing software (such as *HyperStudio* or *ClarisWorks*) (one option) Java-enabled Web Broswer software (such as recent versions of Internet Explorer or Netscape Communicator) (one option) TV Monitor/VCR **For each student:** Computer with Internet Connection and color printer Drawing software (such as *HyperStudio* or *ClarisWorks*) (one option) Java-enabled Web Broswer software (such as recent versions of Internet Explorer or Netscape Communicator) (one option) **Web Sites:** *Tessellations Tutorials* http://forum.swarthmore.edu/sum95/suzanne/tess.intro.html *Tessellate!* (uses Java so must use a Java-enabled browser for this) http://shodor.org/interactivate/activities/tessellate/index.html *Tesselmania Software from MECC* (from http://www.worldofescher.com/store/mania.html) *Tess Software Pedagoguery Software* (from http://www.peda.com/tess/)

	M.C.Escher ThinkQuest http://library.thinkquest.org/11750/ *M.C. Escher* http://www-groups.cs.st-and.ac.uk/history/Mathematicians/Escher.html **Video:** *Math Vantage #4: Tessellations/Transformations*
Materials Required	**For class:** Board with markers **For each team of 2 students:** A set of geometric shapes in all colors and sizes Graph paper Markers, colored pencils, or crayons
Procedures/Activities	1. Put students into teams of 2. Hand out a set of geometric shapes in all shapes and colors. Have students create a pattern using their shapes. 2. Tell students that they are going to learn about a special kind of pattern-a tessellation. Tell them to watch the video and note exactly how tessellations are defined. Start the *Tessellations/Transformations* video at the point where Ellen (the host), has finished shopping and begins to explain the definition of tessellations. Pause when Ellen notes that there are only 3 regular polygons that work as tessellations and have the students predict which shapes these are. Continue the video until Ellen is sitting inside a square. Stop the video. 3. Ask the teams to look at the patterns they created and determine whether or not their pattern is a tessellation. Have those who believe their pattern is a tessellation raise their hand and explain why. Have the class vote to agree or not agree. 4. Tell the students that they are next going to learn about how to create more complex tessellations. Write the terms, "translation," "rotation," and "reflection" on the board and ask the students to pay attention to the definition of these words and how they relate to creating tessellations. Start the video where you left off and play until the end of the explanation for the concept, "reflection." Stop the video. 5. Ask the teams to create a more complex tessellation with their geometric shapes. 6. After you have approved their design, have the students write a description of their pattern using the math terms they have learned. Gather these descriptions and then hand them out randomly to the teams. 7. Tell the teams that they are to try to recreate the tessellation based on the written description. After they have tried to do so, give students a chance to look at the results. Have them review how they might have written more clearly if there are errors in the recreations. 8. Play the portion of the video that is an interview with a quilter. Have individual students create a "quilt block" using graph paper and markers. Post these on wall in the room. 9. Using Web sites and other resources, view M.C. Escher's work and talk about his significance for both art and mathematics. 10. Using software available, have individual students create a highly complex tessellation, ala Escher. You can purchase MECC's TesselMania or Pedagoguery's Tess; use Tessellate! on the Web; or use other software you already have on hand such as *ClarisWorks* or *HyperStudio* following instructions found on the *Tessellations Tutorials* Web site. Print out these creations.
Content Assessment	Give students a worksheet of various patterns, ask them to identify the tessellations and what way the tessellation is formed (translation, rotation or reflection). Collect their pattern descriptions (will need to make a copy for each

	team member), quilt blocks and Escher-style tessellations for their portfolio.
Technology Integration Assessment	The teacher should observe the use of the software during the class, and review the printouts of the Escher-style tessellations.
Extensions	**English:** Have students create a story to go with their quilt block (most quilt patterns have a story to go with them). **Art:** Have students create a real quilt based on their tessellations. **History:** Study the use of quilts in history. **Science:** Learn about bees and their use of tessellations. Tessellations are also used in architecture and construction.